UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
PHILPOTT, JUSTIN M

ART UNIT	PAPER NUMBER
2665	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.		Applicant(s)
Office Action Summary	09/510,905		THODIYIL, JOHN A.
	Examiner		**Art Unit**
	Justin M Philpott		2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>09 October 2001</u> .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-31* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-31* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>23 February 2000</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)		4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)		5) ☐ Notice of Informal Patent Application (PTO-152)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4</u> .		6) ☐ Other: .

DETAILED ACTION

Specification

1.   The disclosure is objected to because of the following informalities: either "the" or "a"

in the phrase "less than *the a* packet size" (page 17, line 2) should be removed.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

3.   Claim 30 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Claim 30 recites the term "said deficit" in claim 28. There is insufficient antecedent basis

for this limitation in the claim. It appears claim 30 depends on claim 29, and not claim 28.

Accordingly, applicant may overcome this rejection by amending claim 30 to be dependent upon

claim 29.

Claim Rejections - 35 USC § 102

4.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

5.   Claims 1, 2, 6, 7, 9-11, 14-17 and 20-24 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,094,435 to Hoffman et al.

Regarding claim 1, Hoffman teaches a method of scheduling data for transmission over a communication link based on priorities assigned to the data, comprising: receiving multiple descriptors (packet pointers, see col. 5, lines 6-26) at a communication interface device wherein each descriptor describes a data portion having an associated priority (packets having associated global priority information, see col. 19, lines 28-36), storing the descriptors in a plurality of memories (queues, see col. 5, lines 11-13 as well as col. 20, lines 34-39) on the communication interface device wherein each of the memories is configured to store one or more of the descriptors, maintaining a dynamic weight (associated weight, see col. 20, lines 46-65) for each of the plurality of memories wherein each weight corresponds to a threshold amount of data associated with the predetermined priority (i.e., the number of packets to be transmitted during a round; see also col. 21, lines 58-65 regarding threshold Ci), and servicing the plurality of memories (col. 18, line 10 – col. 21, line 35). The step of servicing the plurality of memories in

the method of Hoffman requires receiving a descriptor from the memory (receiving a pointer

from the queue, col. 18, lines 26-29), retrieving the corresponding data (col. 18, lines 26-29),

scheduling the data for transmission via the communication link (via scheduler, see col. 20, line

59 – col. 21, line 35), determining whether an amount of data scheduled during the servicing

exceeds a threshold amount of data corresponding to the dynamic weight for the memory (i.e.,

determine if the amount of data exceeds W and/or Ci), and repeating the above for a next

descriptor in the memory if the amount of data scheduled for transmission during the servicing is

less than the threshold amount of data. Evidence of these steps are also indicated in the

scheduler's weighted round-robin scheme in framing method examples (col. 20, line 66 – col. 21,

line 10) wherein various amounts of data (packets) corresponding to a specific memory (queue)

are scheduled for transmission according to a specific threshold corresponding to the dynamic

weight.

Regarding claim 2, Hoffman further teaches the occurrence of the serviced memory

becoming empty (see col. 19, lines 15-19 regarding "affected queue regions are empty"), which

clearly anticipates determining if the memory (queue) contains a descriptor (pointer), i.e.

determining if the affected queue region is empty.

Regarding claim 6, Hoffman further teaches determining if a first memory of the plurality

of memories contains less than a predetermined number of descriptors (see col. 21, line 58 – col.

22, line 22 regarding "congestion register Ci"), issuing a request to a host computer (processor

32 / forwarding logic 52, see FIG. 3) identifying the first memory, and receiving a first descriptor

(pointer) describing a first set of data having first priority (see col. 10, lines 7-10 as well as col.

19, lines 28-36 and line 54 – col. 20, line 28, wherein first priority is defined by global priority information bits comprising "11").

Regarding claim 7, Hoffman further teaches the first descriptor comprises an identifier (address) of a storage area on the host computer containing the first set of data (col. 18, lines 16-17), an indicator configured to indicate whether the first set of data is a starting portion of data for a packet (Qistart, see col. 18, lines 64-67), and an indicator configured to indicate whether the first set of data is an ending portion of data for a packet (Qiend, see col. 18, lines 64-67).

Regarding claim 9, in the method of Hoffman, the threshold (number of packets to be transmitted in a round, see col. 20, lines 48-49) corresponds to the weight (Wi). Thus, Hoffman anticipates the dynamic weights are dynamically modifiable to adjust to the threshold amounts of data.

Regarding claims 10 and 20, Hoffman teaches the communication interface device is a network interface circuit (12, see FIG. 1) and the communication link is a network (14).

Regarding claims 11, 23 and 24, Hoffman teaches the method as described above regarding claim 1, and further teaches if the threshold has been exceeded (i.e., an overrun occurs), maintaining a deficit (TXi count) to determine how much less than the threshold (W) of data may be scheduled during a subsequent servicing of the corresponding memory wherein the deficit is initially proportional to the excess (col. 21, lines 17-35).

Regarding claim 14, see the above regarding claim 2.

Regarding claim 15, Hoffman further teaches terminating the first servicing turn (i.e. discarding the packets of queue Qi, see col. 21, lines 58-65) if the amount of first priority data scheduled for transmission exceeds the first threshold (Ci). Furthermore, it is inherent in the

method of Hoffman to also terminate the first servicing turn if the first memory is determined to be empty, whereby the next level priority memory will be serviced in a next servicing round (see col. 20, lines 40-45).

Regarding claim 16, Hoffman further teaches incrementing a data counter (TXi, see col. 21, lines 17-35) for each unit of first priority data scheduled during the first servicing turn and comparing the data counter to the first threshold (Wi).

Regarding claim 17, Hoffman further teaches the data unit is a byte (col. 6, line 10).

Regarding claims 21 and 22, Hoffman further teaches the first dynamic weight (weight Wi of Q1) is approximately equal to a maximum packet size of the communication link (see col. 20, line 66 – col. 21, line 10) and wherein the second dynamic weight (weight of Q2) may be equal to one.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.   Claims 3-5, 12, 13, 18, 19 and 25-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman.

Regarding claims 3 and 12, Hoffman teaches the methods of claims 1 and 11 as discussed

above, however, does not specifically disclose a step of determining whether a dynamic weight

for one of the memories has changed. Rather, Hoffman teaches a weighting logic for generating

a weight number for each queue (col. 24, lines 62-63) and further teaches programmable

registers containing the weight (col. 20, lines 31-33). Thus, Hoffman clearly teaches changing

the weight of a memory. Furthermore, Hoffman suggests a step of determining whether a

dynamic weight for one of the memories has changed by teaching a scheduler which updates a

threshold (TXi) according to the dynamic weight (Wi) (col. 21, lines 17-35). That is, in each

servicing round, Hoffman determines a new value for (TXi) in accordance with the dynamic

weight (Wi), and therefore, Hoffman suggests a step of determining whether a dynamic weight

for one of the memories has changed. Thus, at the time of the invention it would have been

obvious to one of ordinary skill in the art to include the step of determining whether the weight

of a memory has changed in order to determine whether the threshold (TXi) of Hoffman is to

remain the same as that of the previous servicing round or must be changed according to a

changed dynamic weight value for the current servicing round.

Regarding claim 4, Hoffman further teaches if the amount of data scheduled for

transmission (e.g., packets in output queues) causes the output queue to overflow, decreasing the

priority for a next servicing (round) of that serviced memory (queue) (see Abstract, lines 5-7).

While Hoffman does not specifically disclose decreasing the threshold, lowering the priority

level for a queue in the invention of Hoffman corresponds to lowering the weight of the queue,

which corresponds to lowering the threshold (col. 20, lines 46-58). Thus, by lowering the

priority level for a queue, Hoffman suggests decreasing the threshold. Thus, at the time of the

invention it would have been obvious to one of ordinary skill in the art to decrease the threshold

as suggested by Hoffman in the step of lowering the priority level for a queue.

Regarding claim 5, Hoffman further teaches the threshold (number of packets to be

transmitted in a round, see col. 20, lines 48-49) corresponds to the weight (Wi). Thus, Hoffman

anticipates re-instating the pre-decreased threshold of claim 4 for the next servicing (round) if a

weight changes prior to the next servicing.

Regarding claim 13, Hoffman further teaches the first deficit (represented by TXi) is

directly related to the weight (Wi, see col. 21, lines 17-35), wherein the first deficit indicates how

much of the weight will be transmitted in the current round. Thus, if a weight changes, Hoffman

suggests setting the first deficit to zero by directly relating the first deficit to the weight wherein,

in order maintain the proper relationship and functionality between the first deficit and the

weight, the first deficit must be reconfigured when the weight changes. Thus, at the time of the

invention it would have been obvious to one of ordinary skill in the art to set the first deficit to

zero if one of the first or second weights has changed as suggested by Hoffman by teaching the

first deficit is directly related to the weight.

Regarding claim 18, see the above regarding the first servicing turn in claims 11-16.

Regarding claim 19, Hoffman further teaches a strict priority technique (col. 20, lines 40-

45) wherein the first memory (queue) has the first priority, and when first or second servicing

terminates the first memory (queue) is the next memory serviced.

Regarding claim 25, Hoffman teaches the method as described above regarding claim 11,

however, does not specifically disclose a transmission queue. Rather, Hoffman teaches

transmitting logic (300, see FIG. 8) which transmits packets identified in each queue of the

particular output port (56i) according to select and done signals (col. 6, lines 15-17). Hoffman

suggests a transmission queue for placing packets to be transmitted by teaching that the

transmitting logic performs the same function as a multiplexer and/or transmission queue

whereby designated packets (designated via pointers in the queues) are placed for transmission

over the communication link. Thus, at the time of the invention it would have been obvious to

one of ordinary skill in the art to include a transmission queue for placing packets to be

transmitted as suggested by Hoffman by the transmitting logic performing the function of

designating packets to be placed for transmission over the communication link.

Hoffman further teaches an arbiter (TXi register, see col. 21, lines 11-16) configured to

monitor an amount of data retrieved during the servicing turn in which one of the packets is

configured for transmission, and further teaches wherein weights are dynamically adjustable (see

col. 20, lines 31-33 regarding "programmable" and also col. 24, lines 60-64 regarding

"weighting logic for generating the weight number").

Regarding claims 26 and 27, Hoffman further teaches a loader (packet memory manager

54, see FIG. 3) configured to retrieve packets (from packet buffer memory 44) and load a next

descriptor (via output port 56).

Regarding claims 28-30, see the above regarding claim 11 and deficit.

Regarding claim 31, see the above regarding claims 25 and 26 and transmitting logic 300,

wherein the transmitting logic performs the same function as a multiplexer. That is, the

transmitting logic passes the descriptors (pointers within the queues) corresponding to a specific

packet to an arbiter (TXi, see col. 21, lines 17-35) and a loader (packet memory manager 54).

8.   Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman in view

of U.S. Patent No. 5,732,094 to Petersen et al.

Regarding claim 8, Hoffman teaches the method as described above regarding claim 1,

however, does not specifically disclose transmitting the data scheduled for transmission via the

communication link before the entire contents of a packet comprising the scheduled data are

scheduled for transmission. Petersen teaches packet transmission of data in a network via a

communications link similar to Hoffman and further teaches transmitting the data scheduled for

transmission via the communication link before the entire contents of a packet comprising the

scheduled data are scheduled for transmission (see Abstract, lines 8-12). Such transmission by

Petersen provides means for transmitting stream data wherein early sections of data packets can

be received and accordingly processed at an increased rate. Thus, at the time of the invention it

would have been obvious to one of ordinary skill in the art to apply this teaching of Petersen to

the method of Hoffman in order to increase the transmission rate.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

U.S. Patent No. 5,844,890 to Delp et al., U.S. Patent No. 6,490,248 to Shimojo, and U.S.

Patent No. 6,490,640 to Johansson disclose methods of scheduling data for transmission over a

communication link based on priorities assigned to the data.

10.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Justin M Philpott whose telephone number is 703.305.7357. The

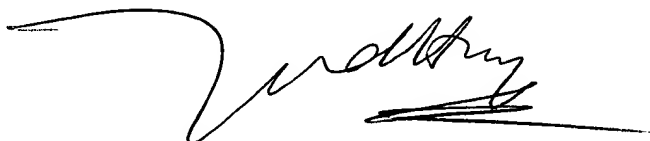examiner can normally be reached on M-F, 9:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Huy D Vu can be reached on 703.308.6602. The fax phone numbers for the

organization where this application or proceeding is assigned are 703.872.9314 for regular

communications and 703.872.9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703.305.4750.

Justin M Philpott

JMP

February 7, 2003

HUY D. VU
SUPERVISORY PATENT EXAMINER
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